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Field Study of Test Panels and Full-scale Facilities

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This research was done in cooperation with the US Department of Transportation, Federal Highway Administration (FHWA), project title: Gabion Mesh Corrosion Comparisons: Continued Field Study

16. ABSTRACT

Caltrans did a long-term field study of corrosion and other damaging effects on wires of gabion mesh at 14 sites in California. At most sites there was a full-scale gabion facility: channel lining, energy dissipater, retaining wall, or slope protection. Two styles of mesh were studied: twisted hexagonal and welded square-grid. The wires had corrosion-protection coatings of either zinc, zinc-and-polyvinyl chloride (PVC-coated), or aluminum. Test panels from 8 products were installed at 5 of 6 sites with full-scale facilities. At a 6th tidally influenced site there were only test panels. Additional sites were investigated where there are full-scale gabion facilities, and only 1 of those sites had test panels of 2 products. When feasible, wire samples were collected from test panels and from full-scale facilities. Samples were tested to failure in tension. Wire strength, expressed as ultimate tensile force, was the fixed variable of the experiment. The null hypothesis was : Is there a difference between mean ultimate tensile forces BEFORE and AFTER exposure at field sites ? BEFORE values were determined in a prior laboratory study of accelerated corrosion. The random variable was location. More precisely, at field sites the local exposures to soil, air, water, and/or sunlight influenced wire corrosion and other damaging effects, and hence gabion performance and service-life. As contrasted to air exposure, some soil and/or water exposures resulted in large measurable losses of wire strength and/or gabion failures. Site-specific soil and water factors are presented to reveal their possible influence on tensile test results, performance, and service-life of gabions. Test panels did not always indicate what happened to a gabion facility, because we often placed test panels in easily accessible areas, which may have received less severe exposure than other parts of the structure. Where severe exposures are expected, alternative designs or materials other than gabions should be considered. From this and prior studies, standard plans and material specifications were developed. They are available on a Caltrans Internet site, and they are included in Appendix A as Standard Plans D100A and D100B and material specifications for zinc-coated and PVC-coated gabions.

Note on 2nd edition. Owners of the 1st edition (May 2001) should replace pages 16, 56, and 107 (Acrobat pages 28, 68, and 119). A few other pages have minor corrections. Conclusions and recommendations are identical in both editions. For general guidance see CONCLUSIONS (last paragraph of page 99, all of page 100), RECOMMENDATIONS (pages 101 through 105), and APPENDIX A (pages 110 and 126). All photos were darkened to improve the images. JAR

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gabion, wire, mesh, corrosion, polyvinyl chloride, PVC, zinc, galvanized, aluminum, strength, ultimate tensile force, standard plans, specifications, soil, water, air, exposure, performance, service-life, retaining wall, channel lining, slope protection, energy dissipater	No restrictions. This document is available to the public. National Technical Information Service (NTIS) 5285 Port Royal Road Springfield VA 22161 phone 1-800-553-6847

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